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ABSTRACT

This monograph stresses the need for environmental protection and identifies principles for a global policy to preserve the world's oceans. It is hypothesized that unbridled technological development pollutes the environment, and particularly oceans, to such a degree that it threatens the future of mankind. Factors identified as being largely responsible for current water pollution include rapid technological development, insufficient understanding of non-renewable resources, use of the ocean as a dumping ground for toxic substances, failure to take adequate precautions against oil spills, and over zealous fishing. These and similar problems can be solved if nations realize the importance of an uncontaminated earth and develop policies to work toward the goal of environmental protection. For example, a global ocean policy would help eliminate pollution if it mandated protective regulations for fresh water systems and polar areas as well as oceans, use of ocean resources without depletion, dissemination of knowledge about water systems, rules for safety of marine transportation, and a permanent ocean authority. The conclusion is that environmental risks should not be undertaken if they threaten human survival and/or involve irreversable damage to the environment. (DB)

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A Bill of Rights for Future Generations

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Proceedings Number 34

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Jacques-Yves Cousteau, Captain of Corvette
Commander, Legion d'Honneur
Member, National Academy of Sciences
Co-recipient of the United Nations Environmental Prize, 1977

About the Author

An introduction by Dr. Gabriel G. Nahas

I first met Jacques Cousteau in the early sixties. At that time, after a productive career in the French Navy where he had served with equal effectiveness in peace and war, he was appointed Director of the Musée Océanographique in Monaco—a position he still holds. Built by Prince Albert at the turn of the century, this was the first such center devoted entirely to the exploration of the oceans. The decade of the sixties was the great era of pioneering exploration for Cousteau and his intrepid team of divers and scientists, who were developing and perfecting the most sophisticated equipment in order to unravel the mysteries of the silent world under the sea.

With his unusually inventive mind, Cousteau applied the latest technological knowledge to the limits of its potential. Already in 1943, he and Emile Gagnan had conceived and released the Aqua-Lung, an invention which gave humanity the possibility of truly exploring the sea. In 1951, in collaboration with Andre Laban, he perfected the first underwater camera equipment for television transmission. The Diving Saucer appeared in 1959, the product of a collaboration with ocean engineer Jean Mollard. The saucer, a revolutionary concept, is a round, highly maneuverable submarine, capable of diving to a depth of over 1,000 feet and permitting two passengers to observe the depths of the sea and film its beautiful images. Cousteau also perfected the saturation diving technique that combines oxygen and helium for breathing in order to escape nitrogen narcosis, the greatest danger facing a diver.

Cousteau was convinced that man might be able to live in the sea from which life once emerged. Following careful calculations

and meticulous planning, he was the first to demonstrate that man could live and work under a pressure 10 times that of our atmosphere at sea level. Two years before the mighty United States Navy, he was able to install 10 divers in a specially designed sphere at 330 feet below sea level for three weeks. This exceedingly perilous enterprise, accomplished without any loss of life, was the first long-term exploration of the ocean floor—so rich in untapped resources.

In 1950, Cousteau acquired the Calypso, a minesweeper of American construction retired from service, and transformed it into an oceanographic vessel. On board this now famous ship, he has since journeyed from the Red Sea to the Indian Ocean, from the Atlantic to the Pacific, from the Antartic to the Aegean. From it he has filmed such subjects as sea elephants and dolphins, coral and whales and, using this material produced over 50 films for television and three full-length features, *The Silent World, World Without Sun,* and *Voyage to the Edge of the World.* Cousteau has also written, or is writing in collaboration with various co-authors, more than 50 books, published worldwide in more than a dozen languages.

In the late 1960's, by gauging the pollution of the ocean, Cousteau, unlike many scientists, realized that unbridled technological development threatened the very future of mankind. It was then that he showed me the first issue of the British magazine, *The Ecologist,* which, empasizing the conclusions of the Club of Rome, stated that the limited resources of the planet were being exhausted by an ever-increasing population. In the process, the life of the oceans was being threatened. "We have to do something about it," he said. Optimistic and a leader by nature, he then decided to devote all of his activities, resources and energies to this new endeavor: the preservation of the oceans and the water resources of our planet. To this end, he created the Cousteau Society in 1973, a non-profit membership-supported corporation, which now numbers more than 160,000 members, principally in the United States.

In all of his endeavors, Cousteau has had full support of his family, which has worked with him as a team. We would see more of his wife, Simone, if she did not have an equal dislike for planes and photographers. A true "old salt," Madame Cousteau prefers the explorer ship, Calypso, which is also the favorite home of the Captain. Their two sons, Jean-Michel and Philipe, have explored

the seas since their earliest years. It was during one of these expeditions on the Flying Calypso that Philipe lost his life—a terrible loss for all. Jean-Michel is carrying on the family commitment to the sea, pursuing studies in marine biology and with his father charting the course of the Cousteau Society.

Protection of the oceans from man-made pollutants has been dramatized thanks to a great extent to Cousteau's continuing efforts. There is another type of pollution that also threatens the future of man. It is the pollution of our internal environment, the body water that makes up 60% of our cells. In the preface Cousteau wrote for one of my books, he stated, "If we are concerned about the external pollutants that threaten our environment, we should be equally concerned about internal pollutants [like mind-altering drugs that impair DNA formation]. For sheer survival, we must defend ourselves against both kinds of pollution."

In order to protect the health and stability of those to come and the planet on which these future generations are destined to live, the Council of Advisors of the Cousteau Society has attempted to draft a *Bill of Rights for Future Generations.* It is our hope that the nations and peoples of the world will take note of its principles and seek to abide by them.

Gabriel G. Nahas, M.D., Ph.D.
College of Physicians and Surgeons
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Editorial Note:

A short time ago, Dr. Gabriel G. Nahas, known to many friends of the Myrin Institute for his work with us in the area of drug abuse, called our attention to an address of Captain Jacques-Yves Cousteau being planned at Columbia University. Dr. Nahas, as one of the collaborators with Cousteau in the development of the *Bill of Rights for Future Generations*, felt that the Institute might wish to promote the Bill in view of our concern with matters involving man's relationship to nature.

We met with Captain Cousteau and discussed the possibility of sharing his remarks at Columbia with our readers, calling special attention to the proposed *Bill of Rights for Future Generations*. This Proceedings is the result of his lecture, and we are grateful to him and the Cousteau Society for their cooperation in making this publication possible.

We trust readers will share our enthusiasm for Cousteau's valiant fight to protect our environment and, in particular, the oceans of our planet.

A Bill of Rights for Future Generations

A primitive man alone in wilderness had a hard time struggling for the mere survival of his mate, his children, and himself. He had no free time in which to form an abstract concept such as "happiness." Early human beings eventually grouped into nomadic communities, became more secure, and divided tasks among themselves, thus earning leisure time. They were then able to develop the notion of happiness, which would appear to have combined a mixture of safety, comfort, moral and religious beliefs. Security led to population increase, and improved living standards in turn extended the burden imposed by a tribe upon the surrounding environment. When local resources ran short, the community moved to another site. The advent of agriculture, the population explosion, and recently the coming of the industrial age, increased the human pressure on natural resources to a dangerous extent. Linked with the legitimate struggle for survival, ironically, the pursuit of happiness may today endanger the very survival of the human species as well as that of practically all life on earth and in the oceans.

Fortunately, human beings are endowed with exceptional faculties to reason, to assess danger, and to imagine ingenious solutions to the most complex of problems. Facing today's environmental emergencies, the people of the world are armed with faster and better information than ever. I believe that from the heart of the people a new concept of happiness will emerge, based on a better evaluation of the renewable and non-renewable resources of the planet, on a selfless desire to share these resources more equitably,

on respect and love for nature and for life, as well as on the development of new and higher moral standards. If "quantity" cannot be increased indefinitely, "quality," on the contrary, can grow forever. Only when survival and a high degree of quality of life are granted to all will individuals be truly able to seek their own kind of "happiness."

Each year, an increasing number of adults and an even greater number of young people become concerned about the pollution of our environment and how this relates to certain fundamental problems of our time—energy, food, population, to name a few. But solutions to these problems can be found only if we do not slight the vital importance of a healthy global water system rooted in the ocean. What has yet to be fully realized by people at large is that life was born in water, that water is indispensable to life in general, and consequently that efficient protection of the water systems of the whole world is prerequisite for our very survival.

Unfortunately, the ocean has become the sewer for the entire planet. Rain, streams, and rivers drag into the sea toxic particles from the smoke of factories or incinerators, lead compounds from the exhausts of automobiles, pesticides from farms, and cosmetic sprays. Euratom still dumps radioactive waste into the Atlantic. Any irreparable damage done to the water system is an unatonable crime; any human enterprise that *might* bring about such permanent scars must be withheld until it is proven harmless.

The ocean has the capacity to absorb and neutralize a certain quantity of degradable pollutants every year, but as far as non-degradable pollutants are concerned, they pile up in the sea and are biologically concentrated in the flesh and in the entrails of marine creatures; as for those indestructible toxic materials such as mercury, the only acceptable discharge level is, in the long run, *zero*. As a consequence, no lead compound should ever be added to gasoline, nuclear waste should be isolated forever from the water system, international laws prohibiting any discharge of permanent poisons should be formulated by a high ocean authority and implemented and enforced by each country, and the Third Law of the Sea Conference should define "zones of responsibility" for ocean-bordering nations, instead of those dangerous 200-mile "economic zones" that are about to be adopted by some nations.

I should like to focus at this time on two tendencies in modern society, particularly as they relate to the oceans. One deals with man's presumptuousness, the other, his willingness to settle for the short-term solution.

The S.S. Titanic—the 850-foot-long ship that was the pride of the White Star Line—was declared unsinkable by her builders. Commissioned in 1912, she struck an iceberg and foundered during her first Atlantic crossing in a memorable tragedy. During her construction, the Britannic, sister ship of the Titanic, was modified to be even more "unsinkable" than her unfortunate relative. She, too, went down swiftly, after only a year of navigation.

History is full of such examples of technicians and builders pluming themselves on their infallibility. In Aeschylus' tragedy Prometheus, enchained forever in the burning sun to pay for having transmitted fire and science to mortals and for having inspired them with a blind faith in their own enterprises, cries out:

How weak is Science
Confronted with Destiny!

Nowadays, roughly one million tons of proud, "unsinkable" ships are engulfed by the sea or run aground each year, often spreading disastrous oil slicks or deadly chemicals in the ocean. You undoubtedly have heard of one such ship—a certain supertanker called the Amoco Cadiz. In 1978, this 240,000-ton vessel had a catastrophic oil spill off the coast of Brittany, which triggered the largest loss of marine life ever recorded from an accident of this kind. Millions of dead mollusks, sea urchins, clams, and other bottom dwellers were washed ashore two weeks after the accident. Twenty thousand dead birds and 9,000 tons of oysters were also washed ashore. Fishermen reported catching ill fish with skin ulcerations, tumors, and other maladies, even where there was no noticeable smell of oil on the water; while other fish, apparently normal, had a strong taste of petroleum.

It is important to understand the facts surrounding this accident. In early February, 1978, the Amoco Cadiz left the Persian Gulf for Europe. On the final stretch of its journey into the English Channel, it passed Brittany where, during the morning of March 16, the coast was battered by gale-force winds. In this stormy weather

and about 60 miles off course, the Amoco Cadiz had mechanical trouble with its steering gear and was unable to steer. In such an event ships are supposed to call for tugs and a tow line, especially if they are carrying dangerous cargo. Reporting the situation to its owner, the crew of the Amoco Cadiz failed to ask for a tow line. Their communication was intercepted, however, and two German high-ocean tugs went to offer their services because the weather was very bad and a western wind was pushing the ship slowly to shore. It was 8 o'clock in the morning, and it was only in the evening—at 10 p.m.—that the ship was lashed against the rocks of Brittany and disgorged 69 million gallons of crude oil, which spread in a gigantic slick. In other words, there had been ample time to react.

Why was nothing done? The tugs kept circling around the ship, negotiating the fee to which they would be entitled if they towed the Amoco Cadiz away from disaster; the captain kept telephoning the ship's owner, asking how much he should offer, how much he should accept. Time passed. The anchor was not even dropped, which also could have helped. Finally, a line was sent but it was then too late.

So, for a little gain—probably not more than two or three million dollars—the community of Brittany lost billions and experienced for many months to come the disaster about which you have heard. This is typical of the mentality of society today. We put short-term profits ahead of long-term concerns. Shipowners cut financial corners. Governments passively comply. In the end, however, the loss of money is greater than would have been the cost of preventing such disasters in the first place.

Next, the French Government came in and announced that since it was spring, the beaches had to be cleaned before the tourist season began. And what about the fishermen? What about the seaweed, the algae, which are economically important in Brittany as a source of fertilizer and chemicals? The government did not care. What was essential was that in July the beaches look clean. So, before the oil had reached the shore, bulldozers came in, took up the sand and, when the oil had settled on the beaches, spread the sand back on top of it. Eventually, however, the oil began to seep through the sand, making it unsuitable for bathers.

After this oil spill, the European countries organized a meeting, a full-day "think-tank" to which I was invited. A great number of

deputies from most of the European nations—Norway, England, France, Germany, among others—were assembled on both sides of the room. In the center of the room were the experts, of whom I was supposed to be one. The meeting was organized in the following way: One expert for each category of problems was to make a five-minute presentation. Then the representatives of the European people, the deputies, were to ask questions of the experts, who in turn were ready to reply. What actually happened was that every time a deputy was recognized, *he* made a speech and we experts had no real chance to say anything.

What the deputies said in so many words was this: "Who cares about this oil spill? After all, every year tankers, yachts, and commercial ships, when cleaning their bilges, drop 20 to 25 times as much oil in the water as the Amoco Cadiz has done." This may be true, but nobody questioned whether these cleaning practices were not cause enough for concern—tankers alone drop five million tons of oil per year—nor took into account the fact that the Amoco Cadiz caused a *concentrated* oil spill. Although we do not yet know for certain, oil diluted in the sea in minimum quantities may be beneficial because it may provide some food for certain kinds of marine animals. But when it is concentrated as it was in the Amoco Cadiz oil spill, it is a sheer disaster. That is why, if we must have any spills at all, we would prefer several from small tankers to one from a supertanker. Now, why did the deputies take this position? Always for the same short-term reasons—electoral reasons, in this case. And what are elections, if not short-term?

In the United States records have been kept for a great many years of all tanker accidents. It is interesting to note that approximately 75% of these accidents involve tankers that fly what is called a "flag of convenience," the latest of which is the flag of the Maldive Islands. As if the Maldive Islands could have a fleet of tankers! And 94% of the American-owned tankers navigate under a flag of convenience. The Amoco Cadiz, for example, was U.S. owned, crewed by Italians, and flew the flag of Liberia. What does this mean? It means that the ships' owners are making a sizeable profit because the crews of the "Liberian," "Panamanian," or "Maldivian" tankers are underpaid, and as a rule don't have social security, unemployment insurance, or medical care. These ships can therefore be manned cheaply. It also means that a shoemaker in Panama or

Liberia can get a captain's license for $250 without passing any exams. It is not surprising, therefore, that many of these tankers are manned by crews who lack adequate skills and experience. These are the types of questionable standards that apply to a very large segment of the shipping industry. American shipowners are thereby sentencing U.S. taxpayers to pay unemployment benefits for every American sailor whose job is thus given to a foreign, often less well-qualified crew member.

In America, the United Kingdom, and Europe as well as other nations, the economy is fragmented, and each segment is often out for itself with little or no consideration for the community as a whole. Thus, when a chemical factory spews its effluents into the air or water, it saves money by not paying for and installing purification equipment. But then it costs the community 10 or 20 times as much to purify these effluents, to pay for "no-show" absentee workers who have become sick, for their hospital bills, and for damage to the environment. If society today has so little consideration for the immediate community interest, how can we expect it to think about future generations, who are even further removed from the economic concerns of today?

Let me give another example of the disastrous repercussions of the shortsightedness that is so typical of our time. In 1974, a Yugoslavian freighter, the Cavtat, was carrying 900 drums of tetraethyl and tetramethyl lead from England to Yugoslavia. On its way across the Adriatic Sea, approximately three miles off the small harbor of Otranto, which is at the tip of the Italian boot, the Cavtat was rammed by a ship flying a flag of convenience but belonging to an Italian firm. This accident happened at the limits of the Italian territorial waters, so it involved an English product being shipped to Yugoslavia, and a Yugoslavian freighter being rammed by an Italian ship flying a Panamanian flag!

The weather was beautiful, and therefore the ships came apart gently. There was a breach on the starboard side of the Cavtat, but the ship was still afloat. The Italian ship offered to tow the Cavtat to one of two Italian harbors, Otranto or Brindisi, but the captain of the Cavtat refused because he wanted to be towed to a Yugoslavian harbor instead. The captain of the Italian-Panamanian freighter repeated his offer, whereupon the Cavtat's captain asked for additional time. He took a boat, went ashore, and telephoned from

shore to his owners in Yugoslavia. Now here a Communist country is involved, and you will see that the same thing happens as in the non-Communist world. The man telephoned his owner twice, went back to his ship, and five minutes later in perfect weather his ship sank. I can only draw one conclusion, which is that it was scuttled because the insurance company would pay more if they took a total loss than if the damaged ship were towed to harbor. This is the same type of short-term thinking we have witnessed elsewhere. There was no consideration for the long-term consequences of the act.

When the Cavtat sank in July, 1974, Italian authorities claimed that the ship was in international waters and, therefore, was not their responsibility. The Yugoslavian shipowners claimed that the cargo was only a potential pollutant, not an interference to navigation, and therefore not in violation of international law.

Both the United Nations' Intergovernmental Maritime Consultative Organization and the National Academy of Sciences in the United States have ranked tetraethyl and tetramethyl lead, the Cavtat's cargo, among the most lethal of chemical poisons. They are used as anti-knock additives in gasoline and are the pollutants present in automobile exhaust. When dispersed in seawater and metabolized in the fish we eat, the lead compounds can cause insomnia, emotional instability, and hallucinations. Severe poisoning—should a drum leak in the hands of a diver or should children play close to a barrel washed up on the beach—will cause convulsions, insanity, coma, and death.

The compounds are stubborn as well; nature and her seawater can do little to change their biological impact. They are insoluble in water and, although heavier than water, can be carried away by currents. Their deadliness cannot be neutralized by sunlight, which only changes the compounds to triethyl lead, also poisonous. Since the accident occurred, we have experimented and discovered that one teaspoonful in an Olympic-size swimming pool filled with seawater would sterilize all marine animals contained in such a volume of water, and damage many in various other ways. Yet here we had 900 drums of these products, a little more than 300 tons, lying on the bottom of the sea at a point where it measured 300 feet in depth.

In the summer of 1974, GESAMP, a group of expert scientists and engineers that advises the United Nations, was unofficially

asked about the severity of the situation. One of the toxicologists thought that tapping the barrels was much too dangerous; others wondered whether the vessel should be left alone because of the unstable nature of lead and the hazard to divers. The group never gave an official recommendation.

Two years later, still nothing had been done to correct the situation. I was furious and wrote a cover story on it for *Saturday Review*. It made some noise internationally and prompted some tourist organizations to stop sending tourists to Southern Italy for fear that the drums would leak and poison the sea, thereby harming the bathers. Then a miracle happened. A judge in Otranto read the article, conferred with the fishermen in Otranto, calculated the damage done to tourism and to the fisheries, and decided he had to do something about it. First he tried to convince the Italian Government. The Italian Navy came but could not do anything; the waters where the drums lay were too deep. Furious, the judge ordered the president of the biggest state-owned salvage corporation to salvage the drums before the end of the month. The president first wanted to know how he was going to be paid. The judge answered that he did not know, but that if he failed to comply, he would go to jail.

Before the end of the month, ships were there beginning to work. It was a very tough 15 months (I made a film of the entire operation), but 97.2% of the lead was brought to the surface. Thus, the loss was only 2.8%, which is quite good. Of course, that 2.8% represents 10 tons of lead, and that is a pity. But what would have happened if we had done nothing? The drums that were brought to the surface were already badly corroded and would not have lasted longer than two or three years. We already have examples of what could have happened if they had been left where they were. After World War I, mustard gas was immersed in the North Sea in order to get rid of it. Two or three years later, to the surprise of everyone, some of the containers were washed ashore and killed several children on the beach. More recently, one-third of the 45,000 "indestructible," corrosion-resistant drums containing radioactive waste that were dumped off the Atlantic and Pacific coasts of the United States 15 or 20 years ago, burst open and now are slowly releasing plutonium and other long-life poisons into the sea. What

we drop into the sea, therefore, is not to be forgotten. Sooner or later, it will remind us it is there.

A final example of the precarious state in which we find ourselves is the oil spill that occurred in June of this year in the Gulf of Mexico, off Campeche. It is the worst spill to date. Touched off by a spark, the blowout of Ixtoc One, an offshore well drilled by a Mexican government-owned oil company, is spreading every three weeks the equivalent of the Amoco Cadiz spill. As of the time of these remarks, world specialists have tried in vain to stop the flow, and have only succeeded in slightly reducing the output. Just in lost oil, the blowout has already cost more than five million dollars. But that is only a faction of the overall cost in cleanup operations and damage to the environment.

Meanwhile the black tide, pushed by currents, has infested the Mexican tourist resorts, polluted Texas' coastlines, and pushed toward Florida; it is possible that it will follow the Gulf Stream, sterilizing shrimp beds, killing fish, eggs and larvae, trapping sea birds, spreading tar on beaches. The U.S. has asked Mexico for damages, but Mexico has refused, arguing that there was no legal obligation to admit financial responsibility.

This is a tragic illustration of the need for a comprehensive "Law of the Sea," and of the importance of the United Nations' Third Law of the Sea Conference, in which the nations of the world are attempting to establish a code, based on existing oceanic law, that will govern the use of the oceans and their resources. The Conference's task is a difficult one: to try to uphold the now famous resolution, unanimously adopted by the United Nations, stating that the high seas—their treasures and resources—are the common heritage of mankind.

Its objectives, unfortunately, are being undermined by certain actions of the developed nations. The United States, Japan, and the European countries are associated in a mining concern and, for strategic reasons, are putting pressure on the Law of the Sea Conference to adopt unilaterally a resolution that would permit companies to mine "nodules" in the deep sea as soon as possible and without authorization by or contract with other nations. Nodules, the size of a potato on average, contain iron and manganese, of which we have no shortage, but also copper and other rare minerals,

many of which are crucial to industry. Less developed nations, such as Zambia and Chile, fear that such mining would reduce the demand for their ore and jeopardize their fragile economies. The Seabed Committee of the United Nations has recommended that such open-ocean resources be the common property of mankind. This generous and logical conclusion was proposed to the General Assembly by Ambassador Pardo of Malta, and was unanimously adopted. But the resolution has been ignored, hindering significant progress at the Law of the Sea Conference.

Another hindrance is the fact that, early in 1976, under pressure from the East Coast fishing lobby, the U.S. Congress enacted legislation, without waiting for the recommendations of others participating in the Conference, in which it unilaterally extended its so-called economic zone up to 200 miles from shore, giving it exclusive jurisdiction over natural resources within this area. When a large country like the U.S. does this, it is tantamount to blackballing the Conference and the international community. This, I think, is incompatible with the moral leadership of this country. Ironically, the 200-mile economic "protection" zone has proved meaningless when considering the oil spill in the Gulf of Mexico.

I have repeatedly warned governments and the public at large that there is only one body of water on our planet, flowing constantly from one country to another, and that such a moving element cannot materially and should not legally be "annexed" for purely economic reasons. Furthermore, if 200-mile zones are to be created, they should not be considered solely as "economic zones" but rather "zones of responsibility," within which the border states would have to implement a single set of international rules. I have just recently had the opportunity to stress this concept of "zones of responsibility" both to Chancellor Helmut Schmidt of West Germany and to Elliott Richardson, U.S. Ambassador to the Law of the Sea Conference.

I should like to interject an anecdote, which I feel summarizes the predicament we now face. It happened while I was in Jamaica recently, studying the coral reefs. During our diving, we were struck by the scarcity of sizeable fish in this vicinity along the coast. There were practically none. As we were carrying on our work a bit further east, I came across a very old man in a small boat—a

spectacular Hemingway-type character, like the *Old Man and the Sea*. His name was Moses and his age was impossible to determine. He was hauling in fish traps and in each trap were one or two little fish. I accompanied Moses to shore, where he landed his miserable catch, and when I had looked at the nets of his trap I asked him, "Why do you use such a small-mesh net? You know that by doing this you are eliminating the young, and are compromising the future of fishing." He looked at me sadly, and I will always remember his look as he answered with a grave voice, "I know this is not good, but I have to eat."

This man had a better reason for his actions than the oil companies and the owners of the Amoco Cadiz, but in a certain way the same kind of attitude and justifications lay behind his reply. He had to eat, and nobody was providing him with the necessary help to get food. It is with a heavy heart that I remember this encounter, because it demonstrates the difficulty we are now in when approximately one billion people in this world do not eat properly.

How can we convince industry to use smoke-purifying devices, farmers less chemicals, or fishermen regular-size nets, and so on? We cannot do this on a persuasion basis, even with someone like Moses. I talked to him about his children, and he almost cried. He knew he was doing harm to his children, to future generations, but he had to eat. This is the tragedy we now face. How can we trust the sweeping, peremptory assertions of the conventional decision-makers whose actions have frequently put selfish interest before environmental concerns—technocrats, politically-oriented government officials, or profit-only minded big business leaders?

If we believe in progress, as we should, to whom can we turn to obtain an unbiased evaluation of the risks we can accept, not only for ourselves but also for our children, our grandchildren, and the hundreds and thousands of generations to come? The answer is obvious: The average citizen can rely only on his own judgment; his civic duty is then to give utterance to that judgment by all means and as loudly as he can.

It seems to me that each of us can make sound judgments by referring to two basic criteria that are grounded in common sense: In the first place, no risk at all should be taken when survival of the human species is at stake or when the quality of life of future generations may be threatened. (We have no moral right to make

our children pay dearly for our selfish remissness.) Secondly, no chance should be taken on issues that could bring about irreversible damage to the environment in which we live.

There are good reasons to believe that people are beginning to be aware of these criteria and give voice to their concern. In Sweden, after 40 years in power, the socialists were overthrown because the voters became frightened by the risks of irreversible harm inherent in the development of nuclear energy; and in London, a Royal Commission headed by a former advocate of atomic reactors finally recommended, after two and a half years of study, postponement of nuclear-plant development. Meanwhile, in the Mediterranean, the growing concern of bordering populations brought about an international conference to control the alarming pollution in that endangered sea.

As I indicated earlier, the health of the global water system rooted in the ocean is vital to the future welfare of our planet, and is of particular concern to me as an oceanographer. The future needs of society will be well served, however, only if we change our short-term mentality and often arrogant indifference to the results of our actions and focus on long-term considerations and a sound attitude in the use of *all* our resources. It was with this in mind that the Council of Advisors of the Cousteau Society drafted a *Bill of Rights for Future Generations,* to be submitted to the United Nations for its consideration and eventual ratification. The three people who worked hardest on the *Bill of Rights* are Dr. Gabriel G. Nahas, Research Professor of Anesthesiology at the College of Physicians and Surgeons, Columbia University; Dr. E. Allan Farnsworth, Alfred McCormick Professor of Law at Columbia University's School of International Law; and Dr. H. Stanley Thayer, Professor of Philosophy at the City College of New York. The document is written for adoption by the General Assembly of the United Nations, and reads as follows:

THE GENERAL ASSEMBLY,

Mindful of the determination proclaimed by the peoples of the world in the Charter of the United Nations to reaffirm faith in the dignity and worth of the human person and to promote social progress and better standards of life in larger freedom,

Acknowledging that it is among the purposes of the United Nations to achieve international cooperation in solving international problems and to be a center for harmonizing the actions of nations in the attainment of these common ends,

Recognizing that for the first time in history the rights of future generations to exercise options with respect to the nurture and continuity of life and the enrichment and diversity of their mental and physical environment are seriously threatened,

Believing that the preservation and promotion of these rights has a claim on the conscience of all peoples and all nations,

Convinced that each generation has the inherent right to determine its own destiny and the corresponding responsibility to accord a similar right to future generations as an extension of the right of the living,

Solemnly proclaims the necessity of securing the universal recognition of this right and this responsibility; and to this end

Declares that:

ARTICLE 1.
Future generations have a right to an uncontaminated and undamaged Earth and to its enjoyment as the ground of human history, of culture, and of the social bonds that make each generation and individual a member of one human family.

ARTICLE 2.
Each generation, sharing in the estate and heritage of the Earth, has a duty as trustee for future generations to prevent irreversible and irreparable harm to life on Earth and to human freedom and dignity.

ARTICLE 3.
It is, therefore, the paramount responsibility of each generation to maintain a constantly vigilant and prudential assessment of technological disturbances and modifications adversely affecting life on Earth, the balance of nature, and the evolution of mankind in order to protect the rights of future generations.

ARTICLE 4.
All appropriate measures, including education, research, and legislation, shall be taken to guarantee these rights and to ensure that they not be sacrificed for present expediences and conveniences.

ARTICLE 5.
Governments, non-governmental organizations, and the individuals are urged, therefore, imaginatively to implement these principles, as if in the very presence of those future generations whose rights we seek to establish and perpetuate.

This declaration has been discussed informally with Secretary General Kurt Waldheim of the United Nations and is to be brought before the U.N. Commission on Economic and Social Affairs, where it will be considered and discussed. We hope the U.N. will then adopt it as an official policy, an action that would be especially appropriate during this year of the child.

Questions and Answers

Since I believe communication must be two-way, not only one I came here not just to lecture but also to have a conversation with you. That is why I insisted on having a question and answer period following my talk. I have given a great number of lectures in this country since 1951 and have always encouraged questions, because I find that, I for one, learn a great deal this way. And so, if you will begin, I shall try to answer as many as I can.

Question: In your opinion, what is the overall condition of the oceans? What will it take, if it is still possible, to correct the damage done to them?

Answer: The overall condition of the oceans is getting a little worse each year. How bad is difficult to say, because the only gauge we have is the depletion of fish. In the commercial species this depletion is very high, as high as 40% to 60%.

What would it take to correct the damage? It has been calculated very seriously that to make the planet entirely clean—as clean as can be—we must purify effluents at the source instead of trying to purify them later. Avoiding oil spills from ships, or improperly managed off-shore drilling, avoiding chemical pollutants in smoke, etc. would probably cost 6% of the gross national product of mankind. In this connection it is interesting to note that credit cards are responsible for a 6% increase in the cost of what you buy. Nobody protests the use of credit cards, but if we were to issue an environmental "credit card," then everyone would be outraged. But why? It's only 6%—exactly the same as we have been willing to accept for the convenience of using credit cards!

Question: How do you plan to save ecology and yet keep employment at a steady pace?

Answer: If you really believe the two objectives are irreconcilable, you have been brainwashed by the international corporations, because ecology creates jobs. For example, chemical plants that pollute can be made clean by buying and installing purification equipment. This equipment represents less than 5% of a plant's total investment, but this 5% will create new jobs to manufacture these purifying devices. There is a wonderful association in Washington, D.C., called "Environmentalists for Full Employment." Its work is vital because, of course, employment is vital. So I simply don't accept the concept: either ecology or jobs. That is a wrong set of alternatives.

Question: Please comment on sea mining, specifically, the mining of magnesium.

Answer: Dredging the nodules is relatively harmless for the environment, but unfortunately a study has proven that it is not economical unless the minerals are then treated on board ship, which means that all the resultant waste is then thrown back into the ocean. And that we are against. We don't want the Pacific turned into a Lake Superior.

Question: Are dolphins and other intelligent marine animals affected by our carelessness?

Answer: That's a very good question. They are beginning to be. In the Mediterranean there are whales that have been there for centuries. They are gray fin whales, about 60 to 70 feet long—beautiful creatures. They swim around Sardinia and Corsica all year long, eating plankton. They are like cows in a pasture, really, and we have always seen them there. Many years ago we installed our anchor and moored our laboratory buoy half-way between Corsica and France. They used to come and rub their bellies against the buoy to rid themselves of various parasites. Then a chemical company in Italy began to dump vast quantities of waste containing a lot of sulphuric acid into the sea, and these whales began to beach in substantial numbers with their skins burned.

Now dolphins, as you probably know, are beginning to be victims, too—in this case, of the purse-net system of fishing introduced by tuna fishermen in the Pacific. The fishermen stalk

schools of tuna by ship. They know that first they will see dolphins, then tuna. If the dolphins are swimming at the surface, they are sure the tuna are below. The ships close around in a circle and spread their gigantic purse-net. They pull the net together and invariably catch dolphins with the tuna. Last year, in spite of the Marine Mammal Act, the American Government officially sanctioned the killing of more than 75,000 dolphins, in conjunction with tuna fishing. So yes, whales and dolphins are affected by our carelessness.

Question: Is there any research to support Dr. John Lilly's hypothesis about the intelligence of dolphins?

Answer: There had been a lot of research done by the American Navy until public opinion barred the Navy from using dolphins as weapons. Then the Navy dropped the whole thing.

Question: How intelligent do you believe dolphins and whales are?

Answer: I devoted a volume of my *Encyclopedia* to that, because it is a difficult subject about which to talk. All whales are not similarly intelligent. The toothed whales are far more intelligent than the others, but among the toothed whales, all are not equal. I personally have checked the extraordinary capacity for abstraction of the Narwhal and of the Sperm Whale. With dolphins, those that are shown in harbor circuses, marine lands, etc., are the most docile, but not the most intelligent. The most intelligent refuse captivity.

Question: In this country environmentalists are suggesting two approaches to help curb pollution—one by regulations, which you seem to support, the other, by taxing pollution. Do you support this latter approach as well?

Answer: Of course I do, but most of the fines at the moment are so small that the polluters are delighted to pay these taxes. In the Seine Bay in the north of France, there is a factory that for two years has paid a fine of 5,000 francs every day. They have not changed their pollution system, because it is far more economical for them to pay these 5,000 francs a day. If it were five million francs, I suppose they would change it. There is "collusion" here between government and industry. The government imposes a fine to satisfy the environmentalists, but makes it small enough not to interfere with the industries. That's the way it works everywhere, including in the Communist countries.

Question: Are you satisfied with the research priorities pushed upon the United Nations Environment Fund by the less developed countries, as well as by the developed nations?

Answer: Yes. For the moment, the United Nations Environment Fund is the most efficient agency of the United Nations.

Question: Is enough attention being paid in UNEF to the research of critical, global, environmental programs?

Answer: Yes, they are doing a very, very good job.

Question: What can be done to improve UNEF?

Answer: Make them better known. Demonstrate their efficiency to people, so that governments will be obliged to increase their subsidies.

Question: In his voyage across the Atlantic in *Ra II,* Thor Heyerdahl spoke of seeing huge globules of oil deposited by tankers that had washed their hulls in the ocean. If the ocean is so huge, how is it possible to police and control such indiscriminate pollution?

Answer: By satellite—it is feasible.

Question: What can I, as a mere individual with no political influence, do to help further the cause of conservation?

Answer: Join one of the conservation groups and learn from them, so that you can become an apostle and preach. There are many such groups. In fact, I'm beginning to be worried by the number.

Question: What should the United States or other nations do to protect the environment?

Answer: The United States has done a lot already. You have a number of bills that are very good. These bills are not always implemented, and sometimes Congress reverses itself and undoes what good it has done the year before, but I assure you that you have the best set of laws in the world today. It's not enough, but it could serve as a model for other countries.

Question: Many leaders of educational institutions serve as directors of corporations that are responsible for the exploitation and destruction of the environment. Also, many corporate leaders are trustees of universities. Doesn't this constitute an unhealthy alliance where the shaping of opinion on environmental matters is concerned?

Answer: It often does. When the controversy about Proposition 15 came along in California several years ago, which involved the

question of nuclear energy, the power companies launched formidable propaganda in favor of nuclear energy. They spent eight million dollars against the $850,000 the environmentalists could gather. So we were defeated, but honorably: 35% of the votes were for us. During the fight, the so-called "pro-nukes" put together a list of Nobel-prize-winners and eminent scientists who were "for" the atom, and we made an impressive list of nuclear physicists and Nobel-prize-winners who were "against" the atom, and we both ended up with about the same number. So where does the average citizen go from there? He scratches his head and says, "Whom to believe?" And he votes for the one who spends the most money in the campaign. We eventually hit upon a way to clarify what motivated many of the "pro-nukes," which might in turn have helped clarify the issue for the public, but unfortunately it was too late. We were able to spot those scientists who had an interest in the development of nuclear power, either directly, because they belonged to the Board of a power corporation, or indirectly, because the lab was subsidized by a power corporation. And we thereby disqualified 75% of the names on their list, and 10% of the names on our list.

Question: Please comment on the use of civil disobedience as a strategy for stopping the construction of nuclear power plants. Do you endorse this approach?

Answer: Thoreau wrote a wonderful treatise on civil disobedience and I think it's still very good. I have nothing to add to Thoreau. What I am recommending to the French anti-nuclear demonstrators is to go with nothing in their hands and to accept being knocked on the head and banged by the police without reaction. The effect is that it automatically disarms the police; they don't know what to do and they feel ashamed of themselves. If there is a fight, it doesn't work. It's very tough to receive bangs on the head without reaction, but it's the only way. That is the best kind of civil disobedience—no violence!

Question: A short-term economic answer is the response to the consumer's demand for cheaper energy products. Shouldn't the consumer share the cost of installing pollution-control devices?

Answer: Yes, of course. But the problem is that such a policy must be international, because national industries will say, "Why should we be penalized if other countries are not"? So the rules have to be

global, because national industries are right. Why, for example, should the Norwegians or the Swedes be penalized if they have strict anti-pollution laws, and others do not? No reason.

While I was working on the *Bill of Rights,* I was at the same time aware that it was not enough. We not only had to establish the Bill properly at the level of the United Nations, not only to educate people about its meaning, but also to establish global policies to oversee the management of specific resources. This led me to ask a group of scientists to draft a global ocean policy to be submitted to the United Nations and to the important nations of this world, together with a practical guide on how to apply it at a national level.

There is a tragic contrast between the indivisibility of the ocean and the selfish way it is and has been handled by individual countries. The way the moving ocean is exploited and polluted cannot be a matter of "internal affairs," since it may severely affect other nations, now and for generations to come. It is our hope that such a policy, which contains ten basic principles, will help to harmonize national viewpoints with the global character of the ocean, and influence decisions taken at the Law of the Sea Conference as well as at a national and eventually private and even individual level.*

Thank you for your questions and for giving me the opportunity of sharing my thoughts with you.

*For those who wish to familiarize themselves with the *Basic Principles of a Global Ocean Policy* to which Captain Cousteau refers, the complete text follows on pages 29 to 33.

Basic Principles for a Global Ocean Policy

1. **Ocean Policies Must Be Global**

Because the oceans of the world are essential to life on this planet; because ideas, culture, knowledge, communications, commerce, travel of individuals and of pollutants are less constrained by geographic and political boundaries than ever before in history, and because both use and abuse of the seas are of consequence to all peoples, a GLOBAL OCEAN POLICY must be established that defines a common set of principles and rules as guidelines for activities of individual nations and for agreements among nations.

2. **Obligations to Future Generations**

Because threats to survival appear to be mounting on a planetary scale, humankind everywhere now shares a common destiny. Moreover, because ocean resources are increasingly recognized as contributing to human needs for food, energy, minerals, and for serenity, pressures are growing for swift and unwitting exploitation. To fulfil a moral obligation that the legacy of the oceans that we enjoy be continued, our first concern must be directed to future generations. Thus, all activities involving the oceans should be undertaken only after various options are developed and consequences and risks for our progeny weighed against anticipated short-term, provincial benefits.

3. **Extension of Ocean Policy to Fresh Water Systems, Polar Areas, and the Atmosphere**

Lakes, marshes, and rivers are the roots of the ocean, carrying to the open sea nutrients and pollutants affecting the productivity and the quality of sea water. Glaciers and polar ice caps have locked in great quantities of water which govern the level of the ocean and are sensitive to natural or man-made climatic changes. Thus the management of lakes, marshes, rivers, glaciers and, indeed, of polar areas and the atmosphere, must be guided by the same principles as those defined by the global ocean policy.

4. **Exploitation Without Depletion**

To obtain maximum long-term benefits from the oceans, public and private enterprise must be encouraged to determine the full resource potential of the sea as well as the most effective means for extraction of food, minerals, and energy without unwitting depletion of the basic capital of a planetary inheritance. Resource management should go beyond yardsticks of economic efficiency to consider social and environmental impact and interdependencies of ocean policy with those policies concerning the land and human activities generally.

—Industrial fishery practices must be modified to conserve and even enhance natural stocks, and aquaculture must be focusing on the production of low cost protein food systems to help meet world nutrition needs. Populations of marine mammals should be maintained at their maximum yield level.

—Deep sea mineral resources must be mined and processed at sea only if permanent damage to the environment is avoided and if profits and risks are shared by all nations according to internationally established guidelines.

—Since the ocean is the most efficient natural concentrator of solar energy, all plausible methods of tapping this inexhaustible renewable energy source must be examined and promising avenues actively developed.

5. **Protection of Ocean Vitality**

Attention must focus on the three most critical zones of the

ocean: the coastal margin. the surface, and the bottom waters, especially to guard against mechanical destruction and pollution.

Substantial sections of the world's coastlines should be kept free from any development. Liquid and gaseous effluents from industrial and urban communities must be limited by innovative technology or treated at each source, especially to exclude toxic non-degradable substances. Dumping at sea of harmful waste must be prevented.

6. **Enhancing and Disseminating Knowledge**

To improve the effectiveness and the safety of managing the global ocean and associated water systems,

—All states must collaborate in scientific research and exploration, to collect information about the sea, its resources and effects of human use. The scientific community must respect rights of coastal states, and share results promptly with all interested parties. At the same time, no arbitrary limits should be imposed upon freedom of research. Indeed, knowledge has to become a common heritage of mankind.

—Worldwide, education should be broadened and deepened concerning marine ecology and the relationship of the oceans to human affairs. All media should be utilized to enhance understanding by the public at large as well as on scholarly levels.

—Conditions of the world water systems and atmosphere must be kept under surveillance, by such universal systems as remote-sensing by satellites. The resulting sustained monitoring of the oceans and regular reports on the state of its health must be part of the cooperative effort of all nations.

7. **Safety of Transportation**

Safety of marine transportation should be sharply improved by adoption and application of international rules on ship design and operation, on personnel qualifications, traffic management, and ship/cargo inspections to assure maximum protection to life, property, and the marine environment.

8. **Peaceful Use of the Oceans**

The oceans must be employed for peaceful and cooperative purposes, to advance world understanding, and to reduce conflict and restrain nationalistic territorial ambitions. Deployment of nuclear weapon systems on and under the sea must be ultimately eliminated.

9. **National Responsibilities**

The 200-mile zones under consideration by the Law of the Sea Conference must be regarded by states in the first instance as "zones of responsibility." In these zones, coastal nations must accept and conscientiously implement international rules and standards for prudent stewardship of fisheries, coastal resources, and for protection of the environment.

—Coastal nations should alert neighboring states in the event of a marine environmental accident and provide assistance to other states to mitigate effects of accidents.

10. **Permanent Ocean Authority**

A world ocean authority must be created to integrate presently fragmented international activities. The authority must work toward scientific understanding of the sea as a rational basis for resource management, define and update rules and standards that will assure balanced and equitable exploitation and conservation of marine resources with due regard for obligations to future generations.

The world ocean authority, working with strengthened international institutions, should assist developing nations in strengthening their domestic technical institutions and their staff, so they may share responsibilities as one of a family of nations collectively dedicated to employing the sea to serve humankind.

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